

Abstract

Generating Syngas for NO_x Regeneration Combined With Fuel Cell Auxiliary Power Generation

During normal operation of a truck engine (12), a catalytic partial oxidizer (30) provides syngas (hydrogen and carbon monoxide) to regenerate NO_x traps (35), for brief periods of time, or diverted (33) to the inlet (13) of an engine (12) via the EGR system (43-46).

5 Some hydrogen is extracted from syngas by a palladium membrane separator (63) and passed to the fuel inlet (52) of a fuel cell stack (51). The stack (51) provides auxiliary electric power to the truck. Humid air from the air outlet (55) of the stack is provided to a fuel/exhaust/air static mixer (25). A methanator (66) may convert

10 CO, leaked through the palladium membranes, into CH₄. Water/gas shift or steam reformer catalyst (76) at the inlet to or inside of the palladium membranes separator may provide some additional H₂.